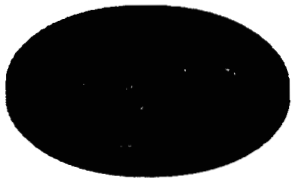


NASA Electronic Parts & Packaging Program

Sammy Kayali

Jet Propulsion Laboratory

Tel: (818) 354-6830

Fax: (818) 393-4559

Email: Sammy.A.Kayali@jpl.nasa.gov

NEPP Program Objectives

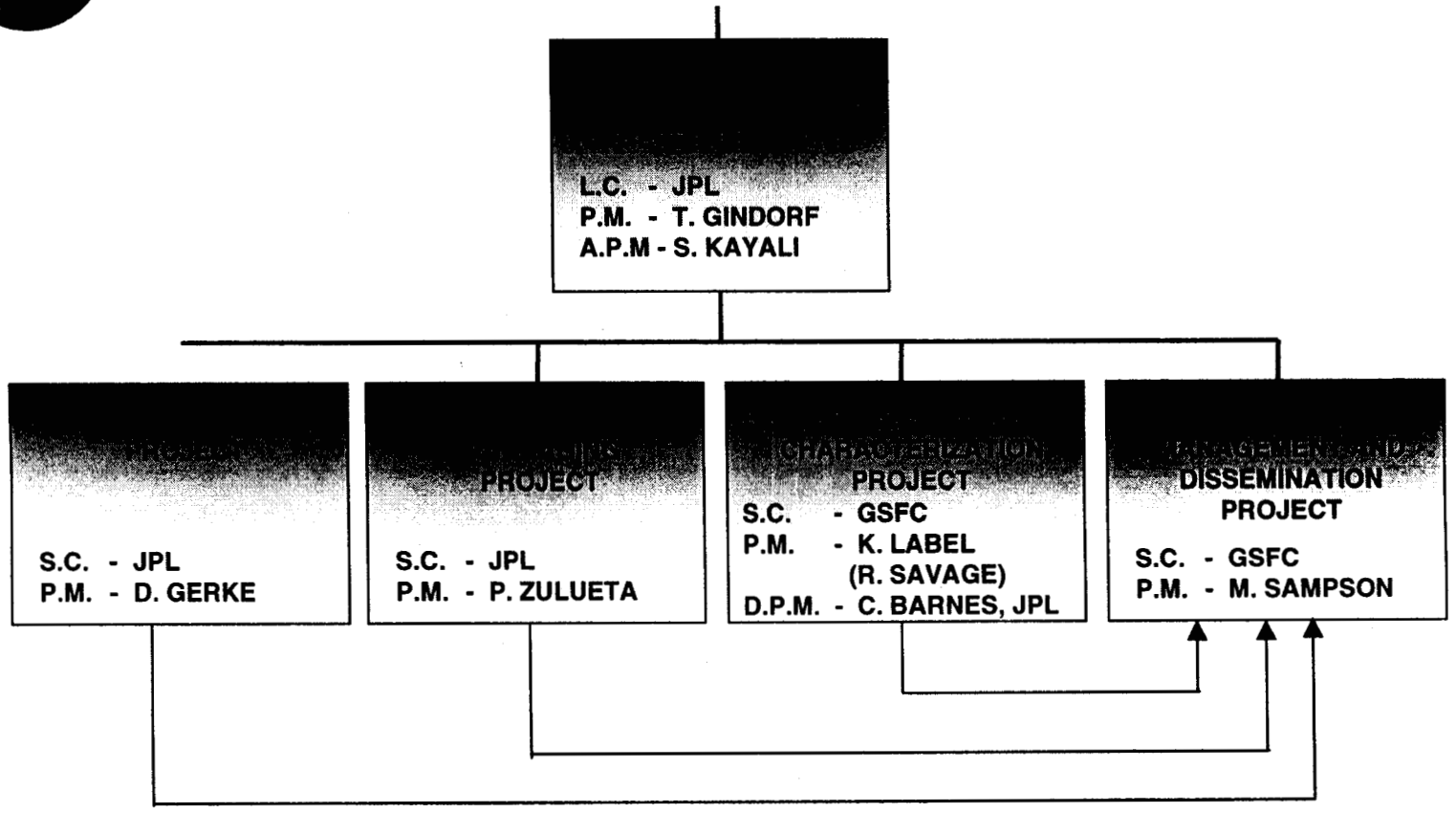
I. Access the reliability of newly available electronic parts and packaging technologies for usage on NASA projects through validations, assessments, and characterizations, and the development of test methods/tools.

II. Expedite infusion paths for advanced (emerging) electronic parts and packaging technologies by evaluations of readiness for manufacturability and project usage consideration.

III. Provide NASA projects with technology selection, application, and validation guidelines for electronic parts and packaging hardware and processes.

IV. Retain and disseminate electronic parts and packaging quality assurance, reliability validations, tools, and availability information to the NASA community.

PROGRAM STRUCTURE
AE



APM - ASSISTANT PROJECT MANAGER
DPM - DEPUTY PROJECT MANAGER
LC - LEAD CENTER
SC - SUPPORT CENTER
PM - PROGRAM OR PROJECT MANAGER

TEG 02/11/99

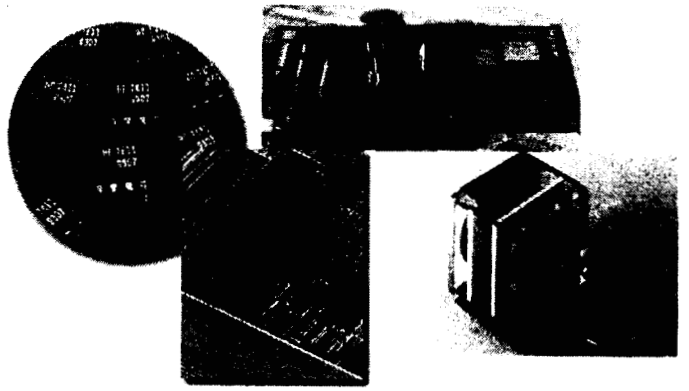
Electronic Parts Project

OBJECTIVES

- Evaluate New and Emerging Device Technologies for Application in High Reliability NASA Systems
- Identify Common Failure Modes and Mechanisms and Methods for Risk Mitigation
- Provide an Infusion Path for Application of New Technology in NASA Systems

FY99 TOPICS

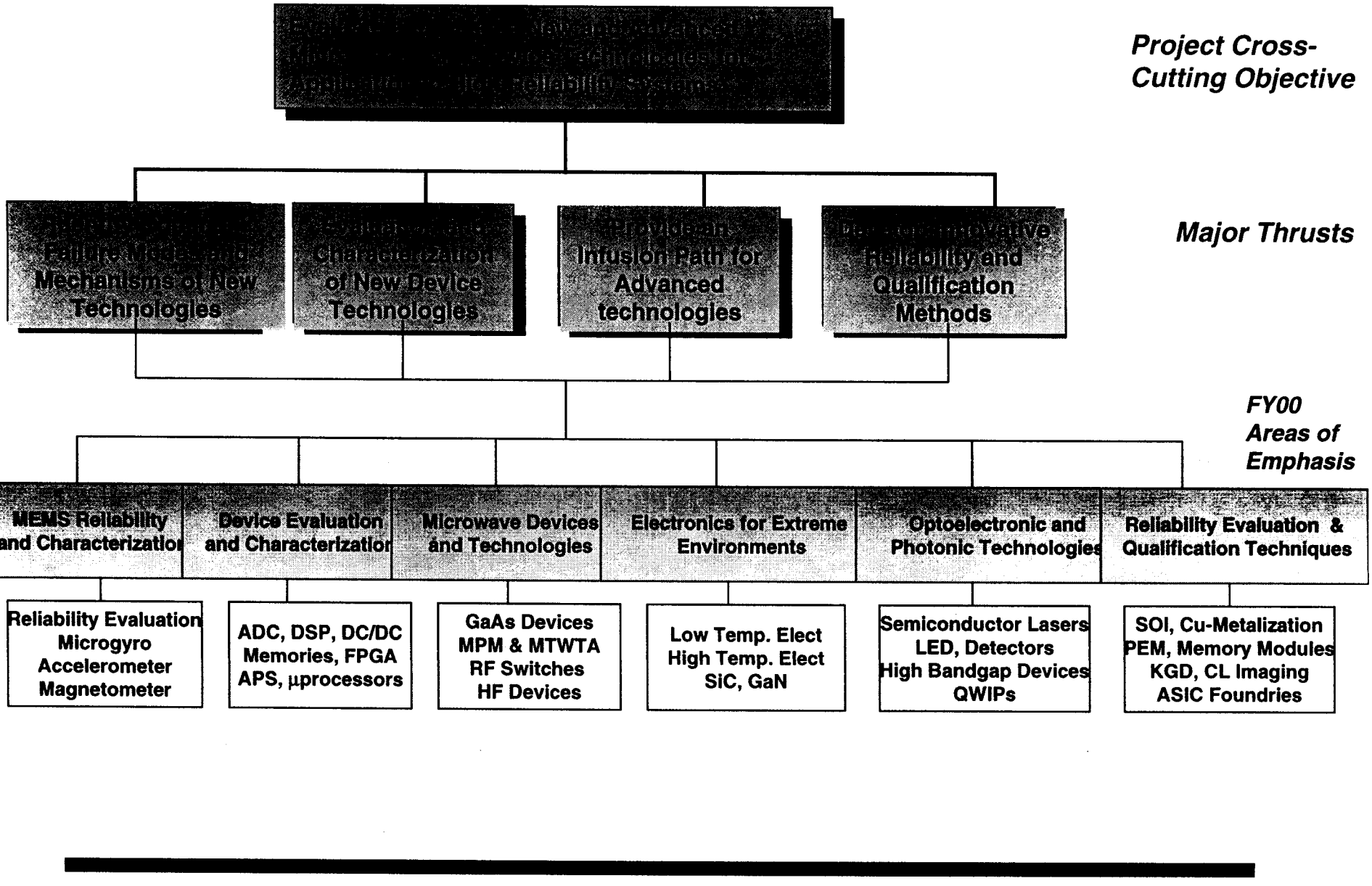
- Low Temperature Effects on Part Reliability
- MEMS Reliability Assurance
- Si/SiGe HBT Reliability
- Low Power Electronics
- High Temperature Superconductors
- Advanced Microwave Power Amplifiers
- Compound Semiconductor Reliability
- Optoelectronics and Photonic Devices
- Space Flight DSP Qualification
- 32-Bit Microprocessor
- Power Supplies Qualification
- Hybrid Microelectronics Reliability



COLLABORATIONS

- **University** UC Irvine, U. of Massachusetts, Texas A&M University, Caltech, CMU, UCLA, University of Maryland, University of Michigan, Cornell University, New Mexico State University
- **Industry**: Texas Instruments, Lockheed Martin, TriQuint, NSC, InSyte Corp., Interpoint, Raytheon, TRW, Boeing, Motorola, Hughes, Spectrum Astro, SAIC, Harris, Advanced Analog,Aerospace Corp, Failure Analysis Associates,TLC, Honeywell, TNP, Endevco, Allied Signal
- **Government**: NRL, NIST, APL, RL, AFRL, US Air Force, US Navy, Sandia, NSA

FY00 Electronic Parts Project Objectives and Technical Areas



Radiation Effects and Testing

OBJECTIVE

Assist NASA and its Contractors in the Selection of Radiation Tolerant Microelectronic Devices for Insertion in NASA Flight Systems by Establishing Radiation Hardness Assurance (RHA) Through Radiation Testing and Analysis

APPROACH

- Establish Radiation Hardness Assurance for Commercial off-the-Shelf (COTS) Devices Used in NASA Systems
- Evaluate Radiation Effects Response of Advanced and Emerging Technologies in Anticipation of Use in NASA Systems
- Assist NASA Enterprises in the Resolution of Common Radiation Hardness Assurance Problems
- Archive Radiation Data for Easy Access by Users

FY99 TOPICS

- Radiation Effects in Optoelectronics and Photonics
- Radiation Characterization of COTS Devices
- Low Dose Rate Effects
- Scaled Devices and Emerging Technologies
- Flight Data Analysis
- Latchup Mitigation and Testing
- Radiation Effects in MEMS
- Radiation Effects in Cold Electronics

DELIVERABLES

- Radiation Test Reports
- Technical Papers and Publications
- Radiation Analysis Reports
- Recommendations For Technology Application
- Characterization Data into RADATA

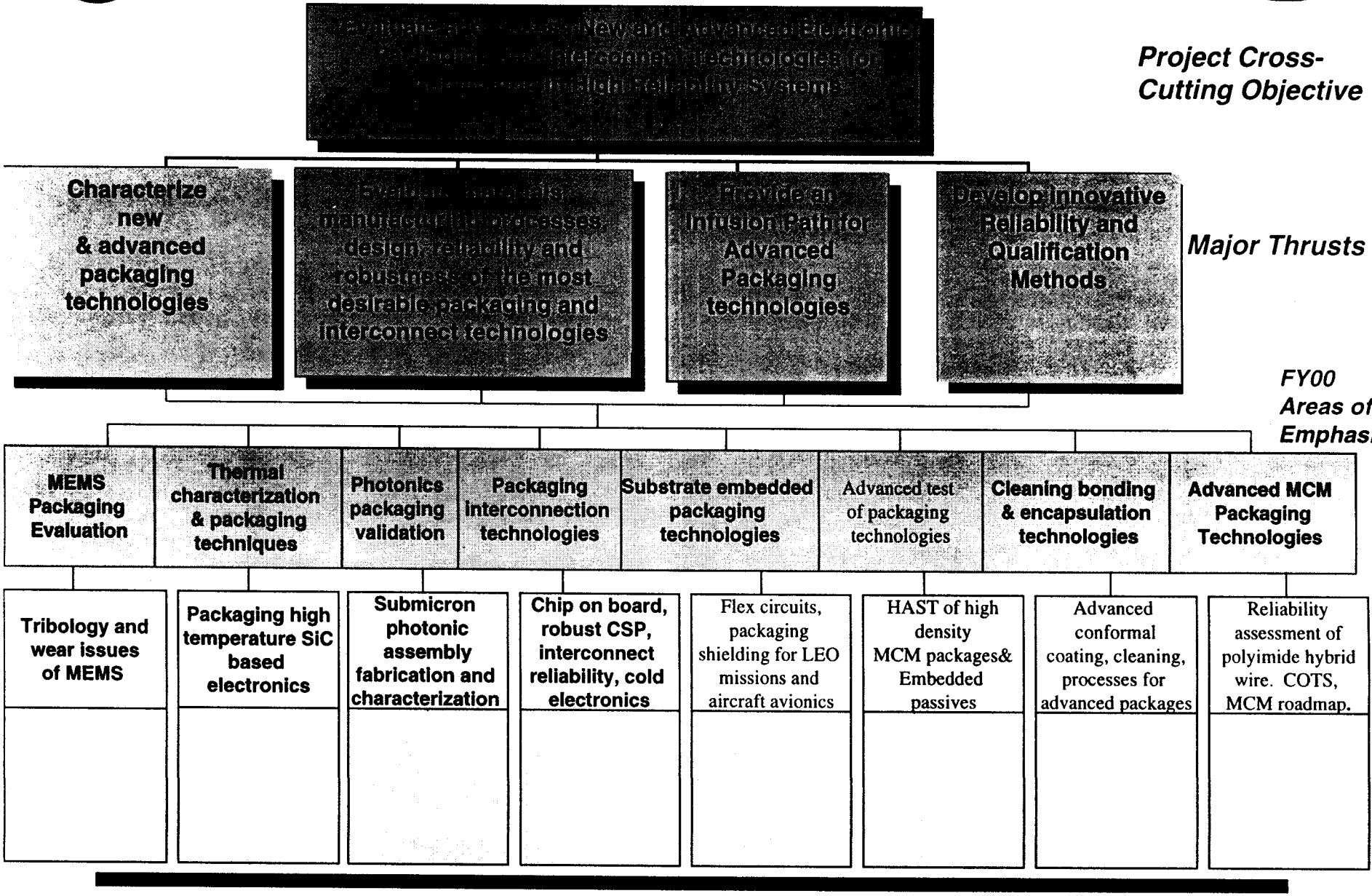
COLLABORATIONS

University: U of Arizona, Vanderbilt,CSULA,USC, U.of Indiana, Prairie View A&M, Texas A&M University, UC-Davis, U. Maryland, Michigan State University, Clemson University

Industry: Lockheed Martin, Boeing, Thompson CSF, Mission Research, OCA Optics, Ball Aerospace, Alcatel Espace, Unisys, UTMC, Saab Erickson, Harris, Spectrum Astro, Motorola, SAIC, SEI, OSC, Opti-Vision

Government: Sandia, DSWA, NRL, AFRL, APL, Mission Research, Aerospace Corp., GSFC (Y), JSC (M), LaRC (R), JPL (S), NSWC

FY00 Electronic Packaging Project Objectives/Technical Areas



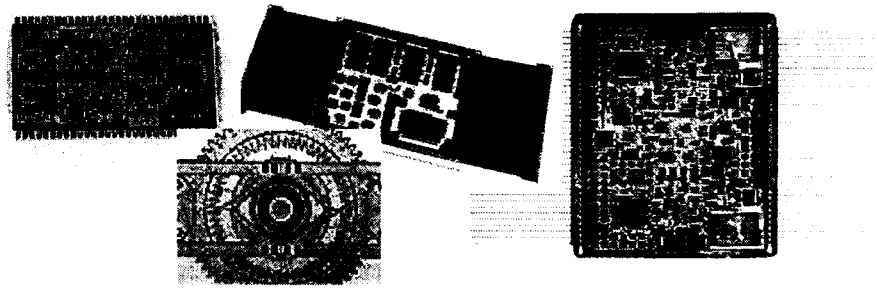
Electronics Packaging Project

OBJECTIVES

- Characterize new and emerging packaging technologies which show promise of supporting NASA mission objectives (e.g., miniaturization)
- Evaluate the materials, manufacturing processes,design, reliability, and robustness for the most desirable packaging and interconnect technologies
- Support NASA projects during their selection, characterization and infusion of new and emerging packaging and interconnect technology

FY'99 TOPICS

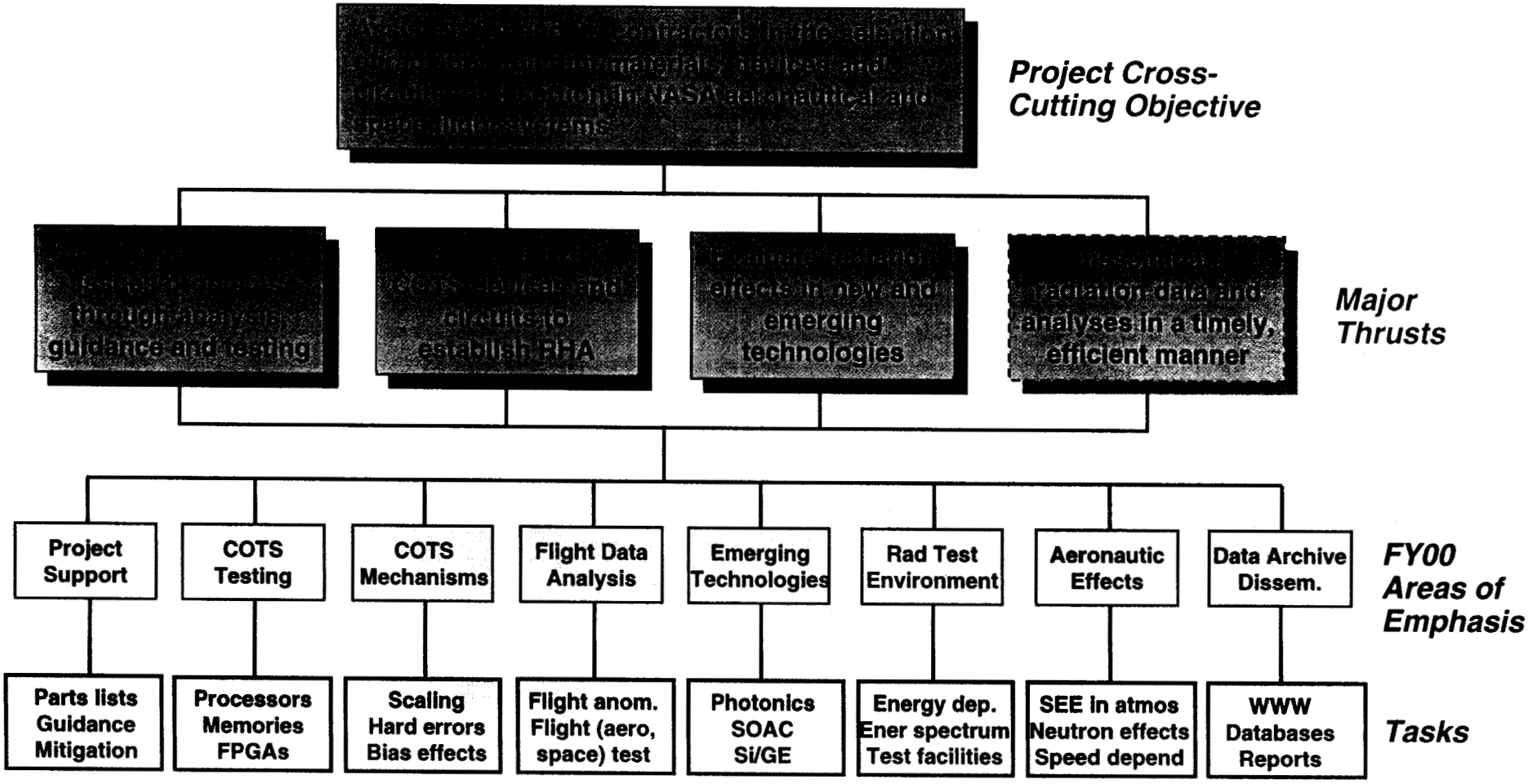
- Chip Scale Packaging
- Chip on Board / Direct Chip Attach
- 3-D Multichip Module Packaging
- Plastic Encapsulated Microcircuits
- Ball Grid Array/ MicroBall Grid Array
- MicroElectroMechanical Systems (MEMS)
- Photonics Packaging
- High Density Microconnectors
- Advanced Adhesion Bonding
- LaRC-SI Flex Circuit
- Advanced Assessment Methods
- High Data Rate Communications Test Bed



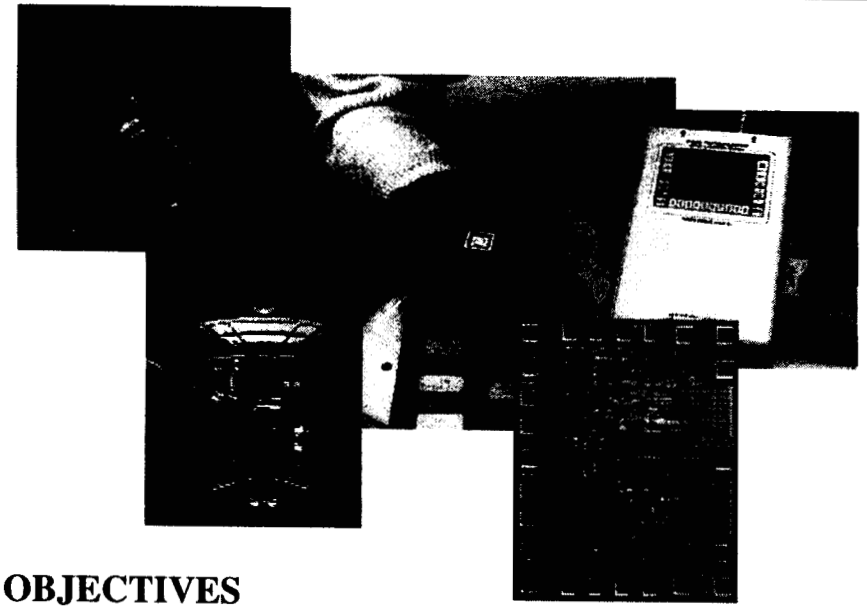
COLLABORATIONS

- University: Rice University, Furman University, Johns Hopkins University, UCLA, University of Limerick (Ireland), University of Wisconsin-Milwaukee, RIT (Rochester Institute of Technology), Binghamton University, University of Maryland, Auburn University.
- Industry: Hughes Aircraft, Boeing(2), TRW, Celestica (formerly IBM Canada), Tessera, Amkor, ChipScale Computing Devices International, AlphaMetals, Texas Instruments(2), Harris Corporation, Packard Hughes, Raytheon, Litton, StorageTek, Seimens, ITT, Abpac, Micron, Sun MicroSystems, Lockheed-Martin, National Semiconductor, Nanonics, Cristek Interconnects, Cannon, Omnetics, Micro-Way, IJ Research, Satec, Standard Microsystems, Flip Chip, AMD, Kyocera, Irvine Sensors, GE Corporate Research Center, Ball Aerospace, IBM (USA), HNS (Hughes Network Systems), LGSemicon, Speciality Coatings Laboratories, Teledyne Electronics, SACTEC/Pico Technologies, Shipley, Gould Electronics Materials, Sheldahl, Ionic Systems, Dow Corning, Sheldahl, nChip, EG&G IC Sensors, Motorola, Ford Microelectronics, Medtronic Inc., MAXIM, Motorola, Visteon (Ford Microelectronics), Delco Electronics, SSI Technologies, Uniphase Telecommunications Products, Seakr Engineering, Inc., Newport Corp, Lightwave, W.L.Gore and Associates, RIFOCS Corp., Northern Lights Cable Company.
- Government:: Sandia National Labs, US Air Force (Rome Lab), Ames Research Center, Langley Research Center.

FY00 Radiation Project Objectives/Technical Areas



Information Management and Dissemination Project



OBJECTIVES

- Develop and Maintain an Accessible Source of Microelectronic Parts Information
- Serve as a Central Collection and Dissemination Point for NEPP Program Information and Output
- Disseminate Parts Evaluation Data and Test Results

BENEFITS

•Convenient, Easy, and Immediate Access to NEPP Product Information and Output
•Central Point for Parts Information and Data
•Coordinated Activities with Industry, Government Agencies and Across NASA Centers

APPROACH

•Coordinate Workshops and Conferences Sponsored by the NEPP Program
•Team with Industry and Government Agencies and Coordinate the Exchange of Parts Information and Data
•Participate in Industry Activities for Standardization and Information Exchange
•Develop and Maintain a Web Internet Access for NEPP Program
•Utilize Existing Parts Information Systems such as EPIMS, EPINS, ASAP, PSAP and IPL for Information Gathering and Dissemination
• Publish the NEPP Program Newsletter

COLLABORATIONS

Industry: Boeing, Hughes Space & Communications Raytheon, TRW, Lockheed Martin, Motorola, Lucent Technologies
Government: NRL, AFRL,Aerospace Corp., NIST

Summary

- Understanding the Reliability Issues Related to Microelectronic Technologies is Essential for Application in High Reliability Systems
- Advancements in Device Technologies Require Continuous Interaction and Involvement in the Design, Fabrication, and Test of Microelectronic Devices
- The Realities of the Microelectronics Industry Dictate the Need for Strong Partnership Between Users and Manufacturers
- The NASA Electronic Parts & Packaging Program Provides a Very Effective Vehicle for Assessing the Reliability of New and Emerging Technologies